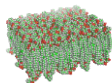


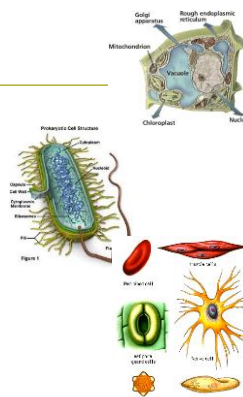
Earth's Early History/ Prokaryotes/ Cell Membrane

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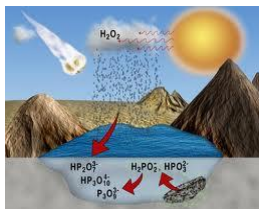
What is a cell?

- The basic unit of all forms of life. Each surrounded by a membrane
- Two Types:
 - **Prokaryotes**- the smallest and most common microorganisms; unicellular and lacks a nucleus. First organisms on earth
 - **Eukaryote**- organism whose cells contain a nucleus



What substances made up Earth's early atmosphere?

- Earth's early atmosphere probably contained hydrogen cyanide, carbon dioxide, carbon monoxide, nitrogen, hydrogen sulfide, and water.
- Early organisms were prokaryotic organisms that did not require oxygen, or anaerobic.



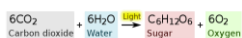
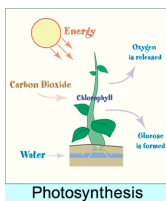
Where did the oxygen come from?

- About 2.2 billion years ago, photosynthetic bacteria (prokaryotes) began to pump oxygen into the oceans.
- Next, oxygen gas accumulated in the atmosphere.
- The rise of oxygen in the atmosphere drove some life forms to extinction, while other life forms evolved new, more efficient metabolic pathways that used oxygen for respiration.(aerobic)

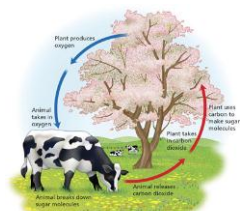


Photosynthesis vs.. Cellular Respiration

Photosynthesis



Cellular Respiration

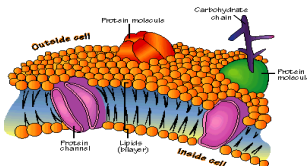


All Cells Have Biomolecules

- Four main biomolecules found in living things:
 - **Proteins**
 - Various functions throughout cells/organism.
 - Enzyme
 - **Lipids**
 - Fats, steroids, oils. Doesn't mix with water.
 - Function: store energy.
 - **Carbohydrates**
 - Function: main source of energy.
 - **Nucleotides**
 - Function: store genetic information
 - DNA or RNA

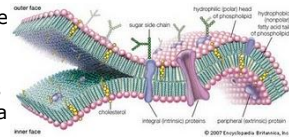
All Cells Have Membranes

- The Cell MEMBRANE regulates what enters and leaves the cell and also provides protection and support.
 - Also Known as:
 - Plasma membrane



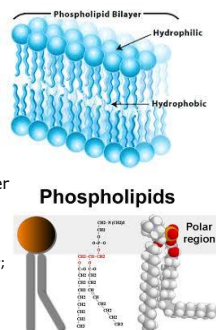
Cell Membrane as a "Mosaic"

- A Mosaic is something composed of a combination of diverse elements.
- There are many different biomolecules inside and outside of a cell membrane which make it complete



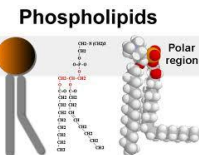
Lipid Bilayer

- The main component of the cell membrane is the phospholipid. Grouped in two layers giving the name lipid bilayer.
- Gives the membrane a flexible structure that forms a strong barrier
- The Lipid
 - **Polar head** is on the outsides of the membrane
 - They are hydrophilic (hydro = water; philic = loving).
 - **Nonpolar tail** is on the inside of the membrane
 - They are hydrophobic (phobic = fearing/hating)



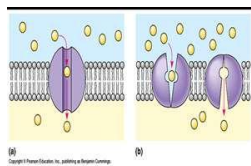
Polar vs. Nonpolar

- Polar means that the substance has positive or negative poles. Non-polar does NOT have positive or negative poles.
 - Polar things like other polar things. Water is polar!!!!!!
 - Non-polar things like other non-polar things. Oil is non-polar!!!!
 - For example, Soap has both polar and non polar substances which make it able to stick to dirt and oil, but then rinse away with water.
- So what does this mean for the cell?
 - It is Selectively permeable- Some molecules can cross the membrane without assistance, most cannot.
 - Slight movement of the lipids allow water and substances to pass through membrane (simple diffusion no energy)



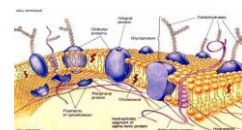
Protein Channels and Pumps

- Studded throughout the membrane are proteins with various functions.
 - **Proteins channels and pumps** help move material across the membrane and help provide identification for a cell
 - **Integral protein (channel)**-found going through the membrane. Allow specific molecules/ions to pass through, thus crossing the membrane.
 - **Peripheral protein** - found on the outsides of the membrane, can be removed, and sometimes serve as markers



Carbohydrate Chains

- **Carbohydrate chain (glyco)**- act like chemical identification cards allowing individual cells to identify one another
 - **Glycoproteins** - chains attached to proteins



Lets Label the Cell Membrane Page 182

